DEVICE AND METHOD FOR REPRODUCING DISK

(Publication number: JP2002074913)

DETAILED EXPLANATION OF THE INVENTION

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to a reproducing device for reproducing data from a DVD-Video disk medium, and a method for reproducing data from the medium.

RELATED PRIOR ART

[0002] A DVD (digital versatile disk)-Video disk reproducing device presents the contents of a disk while esteeming the intention of the contents provider by reproducing data from the disk according to the navigation commands which are recorded on that disk. Therefore, if the initial setting of the disk is set to first reproduce a menu picture and so on, the reproducing operation may not start until the user operates the device so as to select and input reproduction of a content such as a movie and so on.

[0003] Now, such reproducing operation is explained referring to Fig. 7 which shows a flowchart indicating operation of a conventional DVD-Video disk reproducing device. When reproduction of a disk starts (ST1), video manager information (VMGI) is acquired from the disk (ST2). Subsequently, an initial value of the title number TTN is set to 1 (TTN=1) (ST3). Then, in the case in which reproduction of (the content of) a title is directly done by executing a title-play command Title_play (TNN) (ST4), a menu picture is reproduced and displayed (ST6) according to the setting of a pre-command (ST5) which exists at the beginning of the program-chain that constructs the title. Then, the main knitting is reproduced by a selection of the user. Whereas, in the case of a compact-disk (CD) which also is a disk medium, reproduction of the contents will automatically start when reproduction of the disk is done.

PROBLEM TO BE SOLVED BY THE INVENTION

[0004] Especially, in on-vehicle environment and so on, specifications like compact-disk specification is suitable in which reproduction of the contents automatically starts right after insertion of a disk or power-on. Further, in

the case of a disk-reproducing device which has a changer mechanism that accommodates a plurality of disks and exchanges those disks for reproduction, if it is desired by the user to reproduce the next or another disk automatically starts without any user command of exchanging the disks when reproduction of one disk has been completed, it is extremely difficult to automatically change to the next disk as long as reproducing is in compliance with the DVD-Video standard.

MEANS FOR SOLVING THE PROBLEM

[0006] In the disk reproducing device according to the present invention, the disk reproducing device which reproduces a DVD-Video disk comprises:

means for reading and storing a title search-pointer table in the video manager information (VMGI) and a video title set PTT search-pointer table in the video title set information (VTSI) both of which are recorded on the disk;

means for executing a title play command based on the information of the title search-pointer table which is stored in said storing means; and

means for executing a link PTTN command based on the information of the video title set PTT search-pointer table which is stored in said storing means.

[0007] Further, in a disk reproducing method according to the present invention, the disk reproducing method for reproducing a DVD-Video disk comprises the steps of:

reading and storing a title search-pointer table in the video manager information (VMGI) which is recorded on the disk;

executing a title play command based on the stored information of the title search-pointer table;

reading and storing a video title set PTT search-pointer table in the video title set information (VTSI) which is recorded on the disk; and

executing a link PTTN command based on the stored information of the video title set PTT search-pointer table.

[0008] Moreover, the disk reproducing method for reproducing a DVD-Video disk comprises the steps of:

reading and storing a title search-pointer table in the video manager information (VMGI) which is recorded on the disk;

executing a title play command based on the stored information of

the title search-pointer table;

reading and storing a video title set PTT search-pointer table in the video title set information (VTSI) which is recorded on the disk;

executing a link PTTN command based on the stored information of the video title set PTT search-pointer table; and

sequentially executing the title play command for the titles in the stored title search-pointer table, and bringing down the main body (of a disk reproducing device) when reproduction of (the contents of) the recorded titles have been fully completed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Fig. 1 is a block diagram of a disk reproducing device according to the first embodiment of the present invention.

[0010] Fig. 2 is a flowchart which explains the operation of the disk reproducing device of the first embodiment.

[0011] Fig. 3 shows the structure of the logical format of a DVD-Video disk, in which the DISC and VMG structures are shown.

[0012] Fig. 4 succeeds Fig. 3 and shows the VMGI and TT_S structures.

[0013] Fig. 5 succeeds Fig. 4 and shows the VTS and VTSI structures.

[0014] Fig. 6 succeeds Fig. 5 and shows the VTS_PPT_SRPT structure.

[0015] Fig. 7 is a flowchart which explains the operation of a conventional DVD-Video disk reproducing device.

MODE FOR CARRYING OUT THE INVENTION

[0016] (Embodiment 1)

Fig. 1 is a block diagram which shows a disk reproducing device according to the first embodiment of the present invention. Fig. 2 is a flowchart which explains the operation of the disk reproducing device. Fig. 3 shows the structure of the logical format of a DVD-Video disk, and Fig. 4 shows the VMGI and TT_SRPT structures thereof. Further, Fig. 5 represents the VTS and VTSI structures, and Fig. 6 represents the VTS_PTT_SRPT. Figures 3-6 are sequential so that symbols A and B in Fig. 3 are connected to symbols of A and B in Fig. 4 respectively, symbols C and D in Fig. 4 are connected to symbols of C and D in Fig. 5 respectively, and symbols E and F in Fig. 5 are connected to symbols of E and F in Fig. 6 respectively. When a disk 1 is loaded on a turntable 3 and chucked by a

clamper 2, it is rotated by a spindle motor 4. Then, by reading out the data recorded on the disk 1 with an optical pickup 5 (ST11 in Fig. 2) and by decoding the data with decoding means 6, the user can enjoy the pictures such as a movie.

[0017] When such pictures like a movie is reproduced, the information about the contents on the disk is recorded in the video manager information (VMGI) in the video manager (VMG) on the disk (Fig. 3). In the VMGI, a title search-pointer table (TT_SRPT) is recorded, and in the title search-pointer table (TT_SRPT), the number of titles and the start point (start address) of each of the titles are recorded (Fig. 4). According to the logical format of a DVD-Video disk, if a first-play program chain (FP_PGC) exists after reading and acquiring the VMGI, by right, the program chain (FP_PGC) has to be executed so as to carry out the operations according to the commands as described in the program chain.

[0018] In the present invention, information in a VMGI is acquired and analyzed by VMGI analyzing means 8, and information in a title search-pointer table, i.e. the number of titles and the start address of each of the titles are stored in the storage means 9.

[0019] Next, using the information as described in the TT_SRPT stored in the storage means 9, based on the number of titles and the start address of each of the titles, a title play command is (sequentially) executed for each of the titles. Specifically, Title_Play executing means 12 instructs the control means 10 which controls the DVD player to reproduce (the content of) each of the titles from the initialized title number (TTN=1) (ST13) based on the start address of that title (ST14).

[0020] At that time, the information in a video title set PTT search-pointer table (VTS_PTT_SRPT) in the video title set information (VTSI) which lies at the beginning of the video title set (VTS) that constructs the titles and which describes the structure of VTS is stored in the storage means 9 for each address information of the "part of title" (Fig. 5 and Fig. 6). Based on the each address information of the "part of title", using Link PTTN executing means 13 (Fig. 1), a PTT is directly linked by a Link PTTN command (ST15) and reproduction starts. Thereby, execution of a pre-command which exists at the beginning of the program chain (PGC) that constructs the video title set (VTS) can be avoided.

[0021] When the completion of the reproduction of (the content of) that title

is determined by completion determination means 11 (ST16), with the information as described in the TT_SRPT stored in the storage means 9, reproduction of (the content of) the next title number (TTN=TTN+1) is performed based on the start address of that title (ST18).

[0022] When the sequential reproduction has been completed, i.e. reproduction has finished for all of the titles in the information as described in the title search-pointer table (ST17), reproduction of the disk has been completed and the operation goes into the STOP state (ST19). The completion of reproduction of (the contents of) all of the titles can be determined using the number of the titles (TT_SRP_NS) as described in the title search-pointer table information in the title search-pointer table.

[0023] By providing such a construction, a player can be obtained in which, when a DVD-Video disk is inserted into a player, "reproduction of the contents automatically starts" similarly to the case of inserting a compact disk (CD) into a CD player, rather than performing the operation that has been set onto the disk by the contents provider (for example, reproduction of the main knitting starts when the user selects the menu on the screen, in other words, reproduction of the main knitting cannot be started automatically).

[0024] Also, the construction above makes it possible to reproduce (the contents of) all of the titles sequentially. So, in the case of a "KARAOKE" disk and the like, when reproduction of (the content of) one title has been completed, (the contents of) all of the remaining titles can be sequentially reproduced automatically, even though the setting of the operation recorded on the disk is to display the menu picture and wait for the user's selection at that time.

[0025] (Embodiment 2)

Further, in for example a so-called "changer player" in which a plurality of disks are accommodated and mechanically exchanged, applying the present invention makes it possible to sequentially reproduce the disks when reproduction of (the contents of) all of the titles has been completed by detecting the completion and going into the STOP state, even though the specification is that the menu picture is displayed and use's selection is waited for when reproduction of all of (the contents of) the titles on the accommodated disks has been completed.

EFFECT OF THE INVENTION

[0026] As explained hereinbefore, according to the disk reproducing device of the present invention, a disk reproducing device which reproduces a DVD-Video disk comprises:

means for reading and storing a title search-pointer table in the video manager information (VMGI) and a video title set PTT search-pointer table in the video title set information (VTSI) both of which are recorded on the disk;

means for executing a title play command based on the information of the title search-pointer table which is stored in said storing means; and

means for executing a link PTTN command based on the information of the video title set PTT search-pointer table which is stored in said storing means. Thereby, reproduction of the contents can be automatically started right after insertion of a disk or power on without making the user select and input the menu on the screen.

[0027] Further, according to the disk reproducing method of the present invention, a disk reproducing method for reproducing a DVD-Video disk comprises the steps of:

reading and storing a title search-pointer table in the video manager information (VMGI) which is recorded on the disk;

executing a title play command based on the stored information of the title search-pointer table;

reading and storing a video title set PTT search-pointer table in the video title set information (VTSI) which is recorded on the disk; and

executing a link PTTN command based on the stored information of the video title set PTT search-pointer table. Thereby, reproduction of the contents can be automatically started right after insertion of a disk or power on without making the user select and input the menu on the screen.

[0028] Moreover, according to the disk reproducing method of the present invention, a disk reproducing method for reproducing a DVD-Video disk comprises the steps of:

reading and storing a title search-pointer table in the video manager information (VMGI) which is recorded on the disk;

executing a title play command based on the stored information of the title search-pointer table;

reading and storing a video title set PTT search-pointer table in the

video title set information (VTSI) which is recorded on the disk;

executing a link PTTN command based on the stored information of the video title set PTT search-pointer table; and

sequentially executing the title play command for the titles in the stored title search-pointer table, and bringing down the main body (of a disk reproducing device) when reproduction of (the contents of) the recorded titles have been fully completed. Thereby, reproduction of the contents can be automatically started right after insertion of a disk or power on without making the user select and input the menu on the screen. In addition, when reproduction of (the contents of) the recorded titles has been completed, the main body is brought down. Thereby, disks can be exchanged in the case of a changer construction.

CLAIMS

1. A disk reproducing device which reproduces a DVD-Video disk comprising:

means for reading and storing a title search-pointer table in the video manager information (VMGI) and a video title set PTT search-pointer table in the video title set information (VTSI) both of which are recorded on the disk;

means for executing a title play command based on the information of the title search-pointer table which is stored in said storing means; and

means for executing a link PTTN command based on the information of the video title set PTT search-pointer table which is stored in said storing means.

2. A disk reproducing method for reproducing a DVD-Video disk comprising the steps of:

reading and storing a title search-pointer table in the video manager information (VMGI) which is recorded on the disk;

executing a title play command based on the stored information of the title search-pointer table;

reading and storing a video title set PTT search-pointer table in the video title set information (VTSI) which is recorded on the disk; and

executing a link PTTN command based on the stored information of the video title set PTT search-pointer table.

3. A disk reproducing method for reproducing a DVD-Video disk comprises the steps of:

reading and storing a title search-pointer table in the video manager information (VMGI) which is recorded on the disk;

executing a title play command based on the stored information of the title search-pointer table;

reading and storing a video title set PTT search-pointer table in the video title set information (VTSI) which is recorded on the disk;

executing a link PTTN command based on the stored information of the video title set PTT search-pointer table; and

sequentially executing the title play command for the titles in the stored title search-pointer table, and bringing down the main body when reproduction of the recorded titles have been completed.

1 disk

2 clamper

3 turntable

4 spindle motor

5 optical pickup

6 decoding means

7 menu state detecting means

8 VMGI analyzing means

9 storage means

10 control means

11 Title completion determination means

12 Title-Play executing means

13 Link PTTN executing means

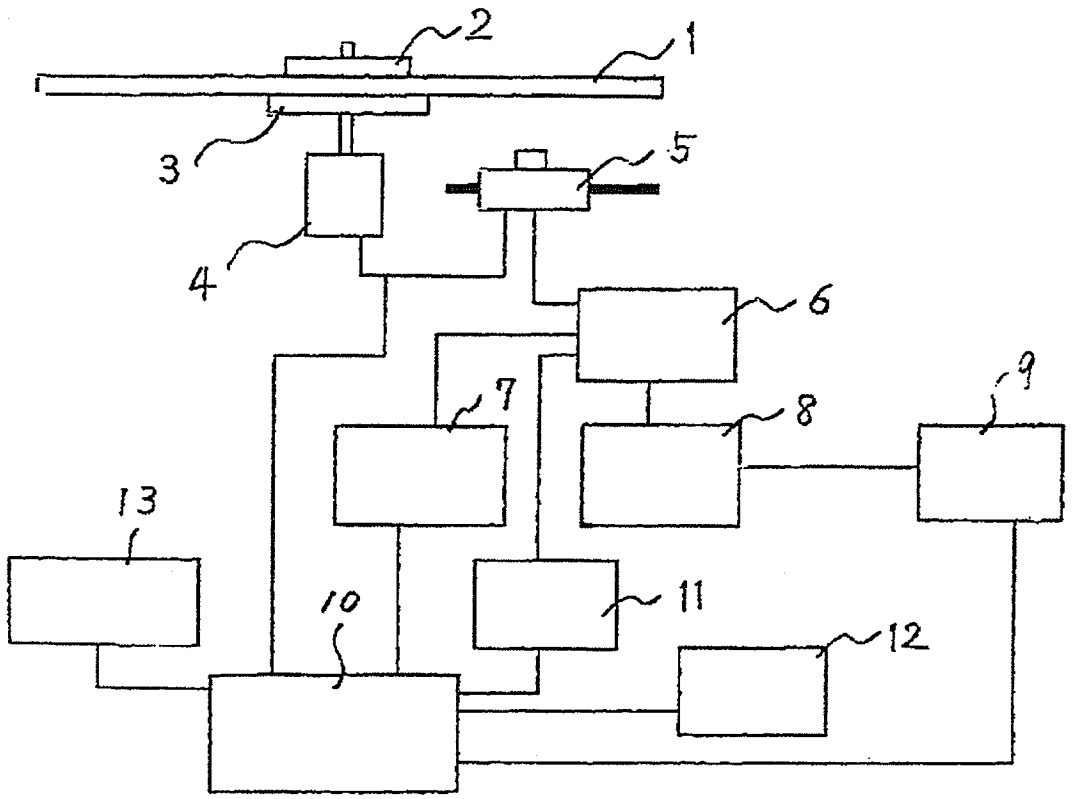


Fig. 1

Fig. 2

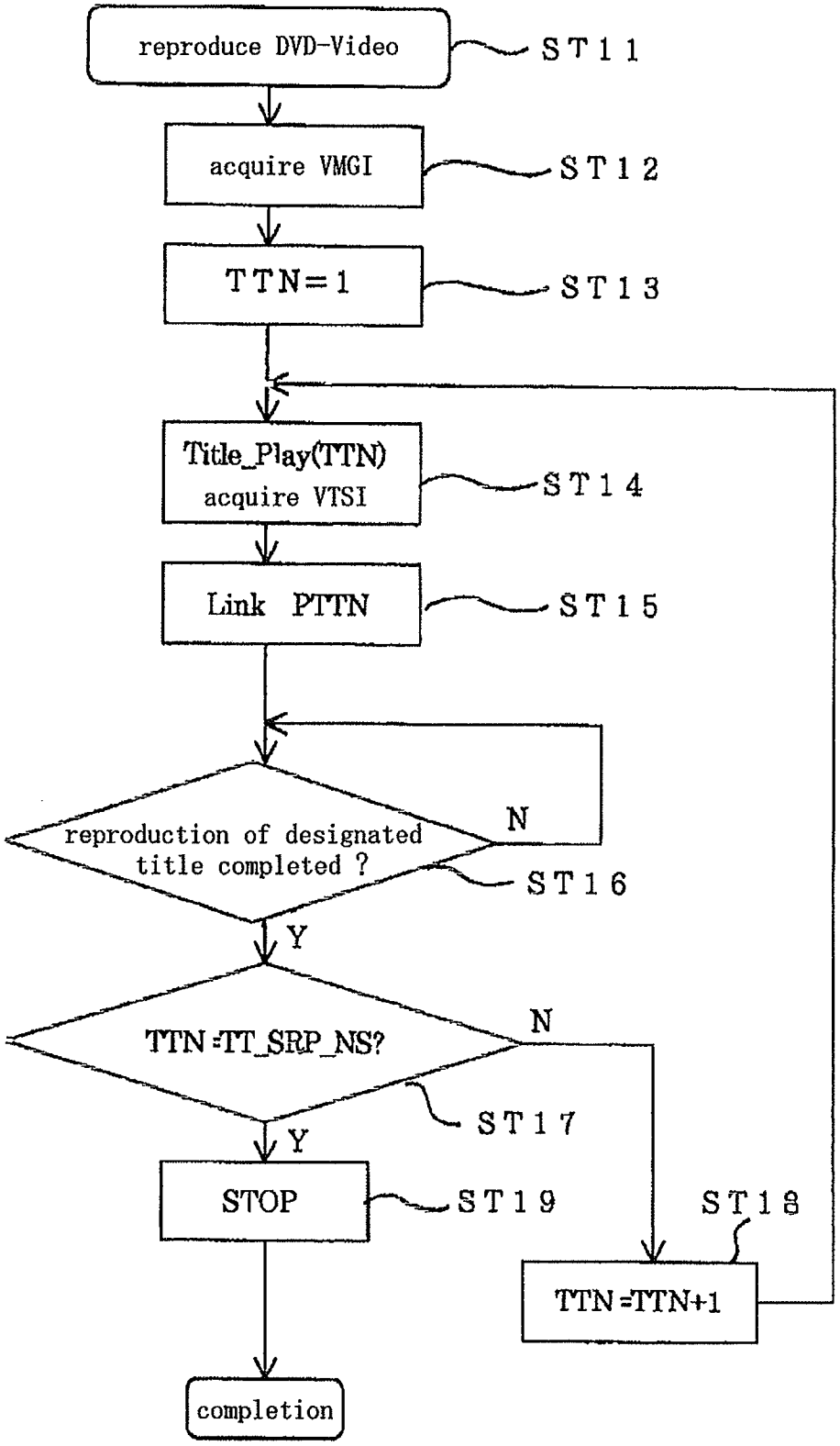

reproduce DVD-Video
ST11
acquire VMGI
ST12
TTN=1
ST13
Title_Play(TTN)
acquire VTSI
ST14
Link PTTN
ST15
reproduction of designated title completed ?
N
ST16
Y
TTN=TT_SRP_NS?
N
ST17
Y
STOP
ST19
ST18
TTN=TTN+1
completion

Fig. 3

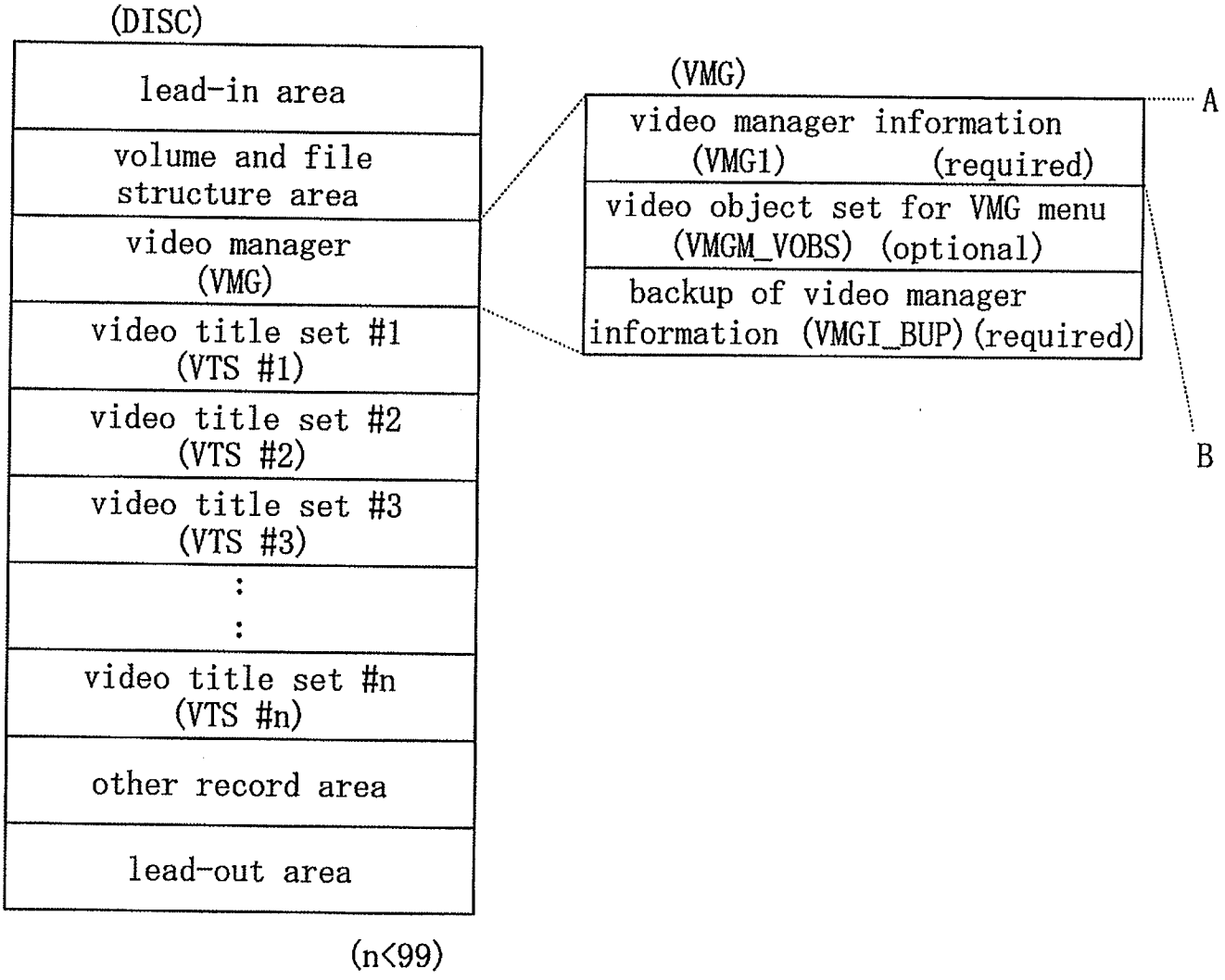

(DISC)
lead-in area
volume and file structure area
video manager (VMG)
video title set #1 (VTS #1)
video title set #2 (VTS #2)
video title set #3 (VTS #3)
:
:
video title set #n (VTS #n)
other record area
lead-out area
(n<99)
(VMG)
video manager information (VMG1) (required)
video object set for VMG menu (VMGM_VOBS) (optional)
backup of video manager information (VMGI_BUP) (required)
A
B

Fig. 4

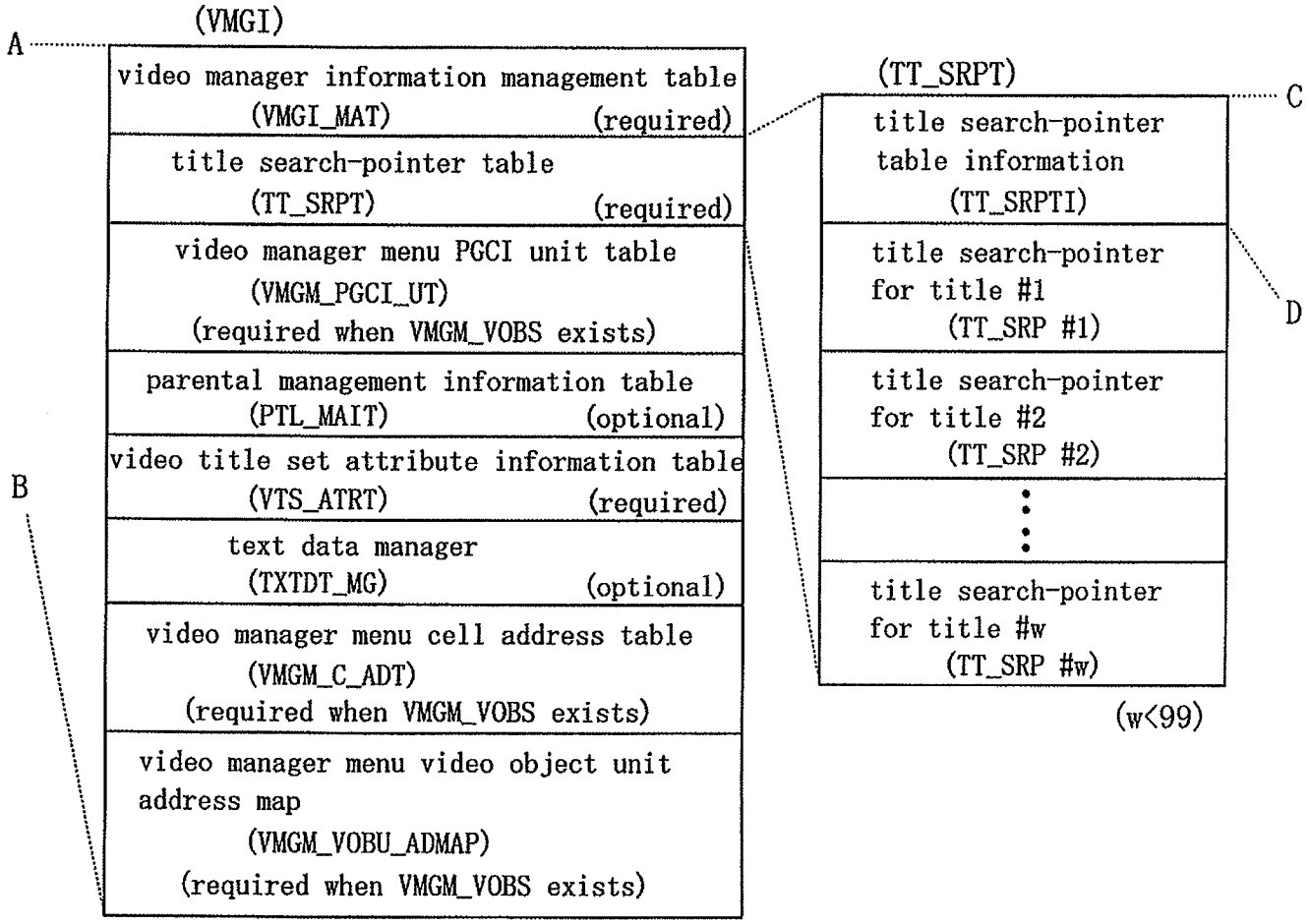

A
(VMGI)
video manager information management table
(VMGI_MAT)
(required)
title search-pointer table
(TT_SRPT)
(required)
video manager menu PGCI unit table
(VMGM_PGCI_UT)
(required when VMGM_VOBS exists)
parental management information table
(PTL_MAIT)
(optional)
video title set attribute information table
(VTS_ATRT)
(required)
text data manager
(TXTDT_MG)
(optional)
video manager menu cell address table
(VMGM_C_ADT)
(required when VMGM_VOBS exists)
video manager menu video object unit address map
(VMGM_VOBU_ADMAP)
(required when VMGM_VOBS exists)
B
(TT_SRPT)
C
title search-pointer table information
(TT_SRPTI)
title search-pointer for title #1
(TT_SRP #1)
D
title search-pointer for title #2
(TT_SRP #2)
title search-pointer for title #w
(TT_SRP #w)
(w<99)

Fig. 5

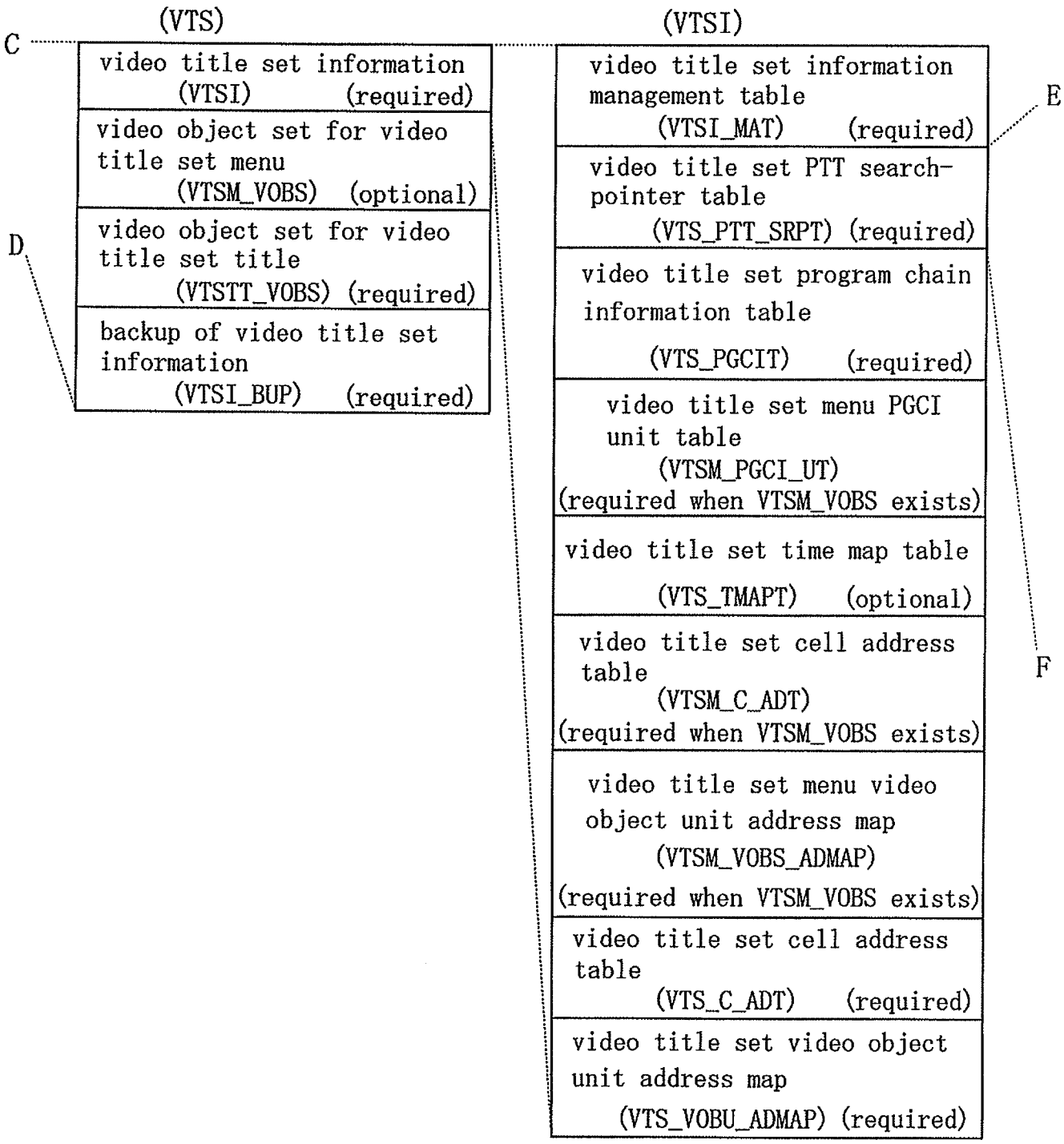

(VTS)
(VTSI)
C
D
E
F
video title set information (VTSI) (required)
video object set for video title set menu (VTSM_VOBS) (optional)
video object set for video title set title (VTSTT_VOBS) (required)
backup of video title set information (VTSI_BUP) (required)
video title set information management table (VTSI_MAT) (required)
video title set PTT search-pointer table (VTS_PTT_SRPT) (required)
video title set program chain information table (VTS_PGCIT) (required)
video title set menu PGCI unit table (VTSM_PGCI_UT) (required when VTSM_VOBS exists)
video title set time map table (VTS_TMAPT) (optional)
video title set cell address table (VTSM_C_ADT) (required when VTSM_VOBS exists)
video title set menu video object unit address map (VTSM_VOBS_ADMAP) (required when VTSM_VOBS exists)
video title set cell address table (VTS_C_ADT) (required)
video title set video object unit address map (VTS_VOBU_ADMAP) (required)

Fig. 6

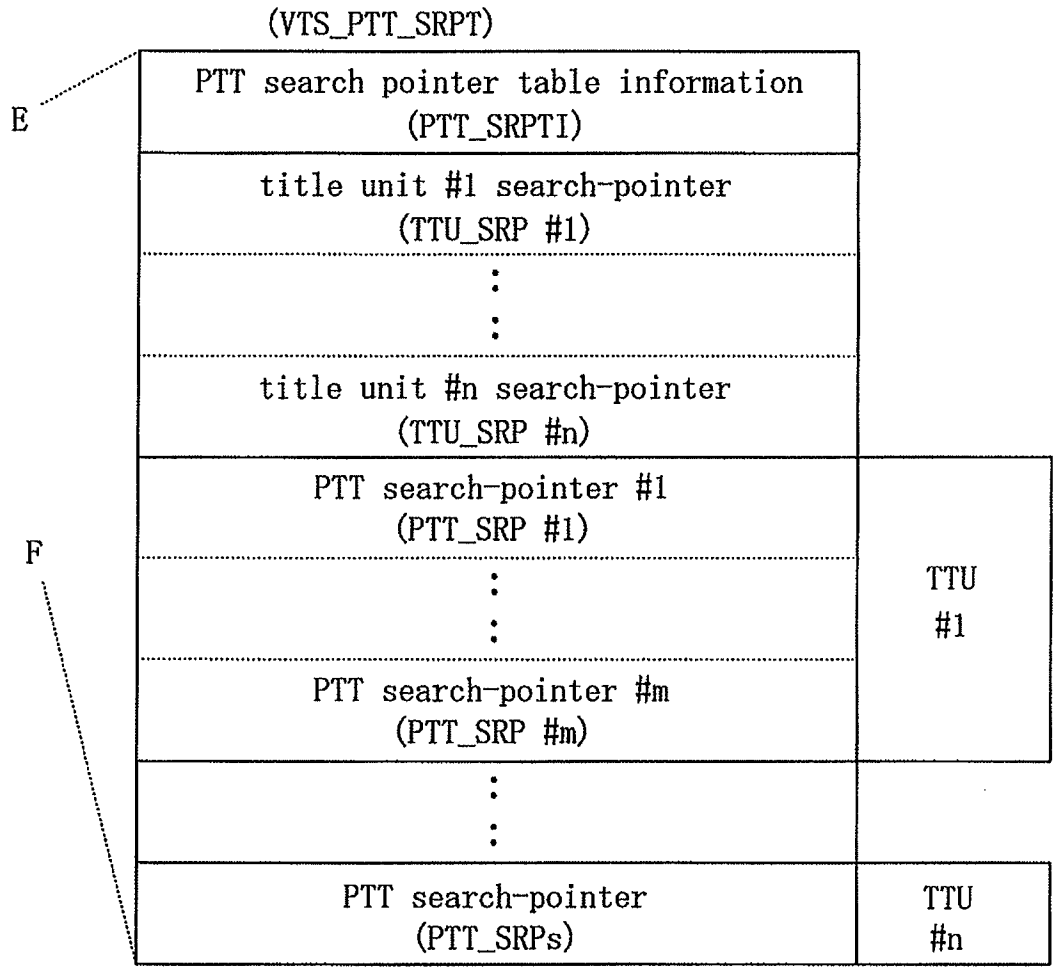
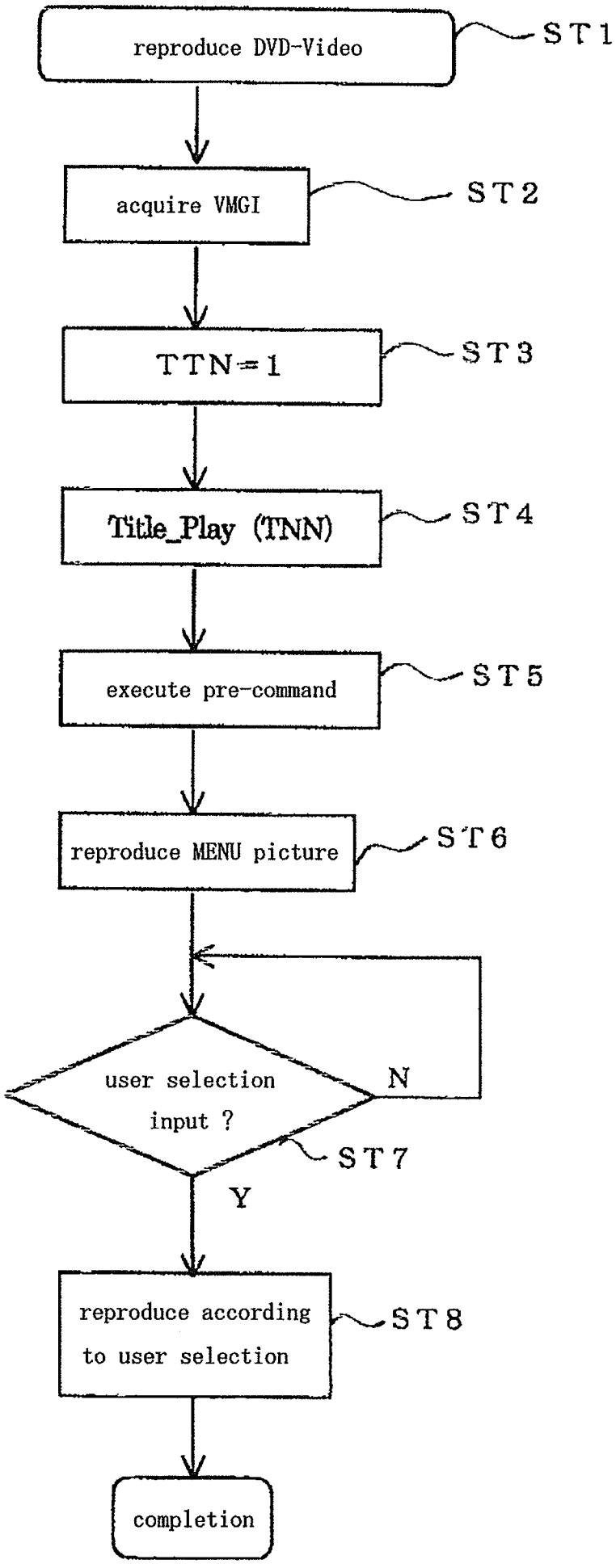

(VTS_PTT_SRPT)
E
PTT search pointer table information
(PTT_SRPTI)
title unit #1 search-pointer
(TTU_SRP #1)
title unit #n search-pointer
(TTU_SRP #n)
PTT search-pointer #1
(PTT_SRP #1)
PTT search-pointer #m
(PTT_SRP #m)
TTU
#1
F
PTT search-pointer
(PTT_SRPs)
TTU
#n

Fig. 7


reproduce DVD-Video
ST1
acquire VMGI
ST2
TTN=1
ST3
Title_Play (TNN)
ST4
execute pre-command
ST5
reproduce MENU picture
ST6
user selection input ?
N
ST7
Y
reproduce according to user selection
ST8
completion